

# DC-9

## PROGRESS REPORT

*file*

AR23



**DOUGLAS**  
AIRCRAFT GROUP

APRIL, 1965/ISSUE NO. **6**





*Over 900 dignitaries attended the DC-9 roll out ceremonies.*



FRONT COVER:  
DC-9 No. 1 enroute to Edwards AFB.  
Also refer to inside spread.

# DC-9

## MILESTONES

### IMPRESSIVE ROLL OUT CEREMONY—

2. On January 12, 1965—one month ahead of schedule—the DC-9 was rolled out for review by 900 guests of honor.

### STATIC TESTS PROVE A RELIABLE JET

6. Static testing is keeping pace and over thirty tests have been made on No. 1. Tests on No. 2 are completed.

### HISTORIC DC-9 FIRST FLIGHT

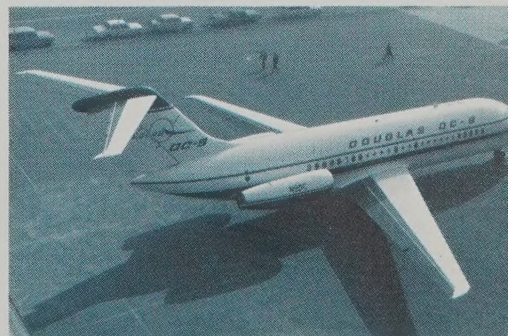
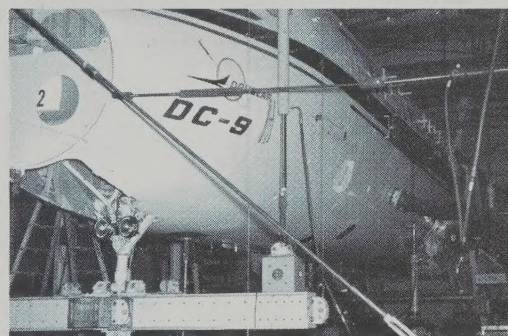
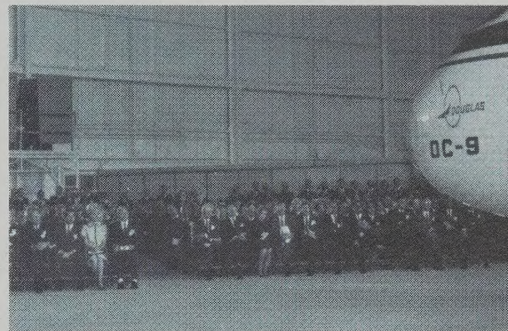
8. First Flight on February 25, 1965—one month earlier than planned—satisfied all expectations.

### DOUGLAS DC-9 MANUFACTURING AND ASSEMBLY IN FULL SWING

12. Assembly progress is phenomenal, since Douglas already is starting assembly on DC-9 No. 10.

### DC-9 SALES SOAR—

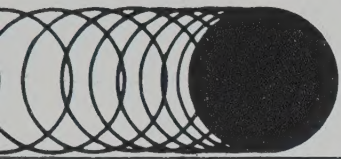
14. Sales for the world's newest jetliner are rapidly increasing. The Box Score of confirmed sales tops 100.











## DC-9

### *makes debut in Long Beach*

An historic ceremony on January 12th, attended by 900 guests of honor, hailed the sleek new DC-9 as America's first contender in the short-to-medium range jet race. See photo at left. This impressive event climaxed an exceptionally well planned schedule noted for its on-time progress ever since Douglas announced its decision to build the DC-9 on April 8, 1963. The following press quotations brief the story...

"Speaking last night (January 11th) at a press conference held at the Beverly Hilton Hotel, Don Douglas, Jr. predicted production of 400 DC-9's which would create 73,000 new jobs, including 19,000 jobs in the aircraft and part industries of California. The festivities were highlighted by Gov. Edmund G. Brown who said, 'The DC-9 is one more indicator of California's versatility in producing for peace even as we maintain our preeminent position as the arsenal of defense.'"

Los Angeles Herald-Examiner 1/12/65

"Long Beach, Calif.—Douglas Aircraft Co. unveiled its first DC-9 twin-jet short-haul transport... 10 months after assembly began here, and is readying the aircraft to meet a Feb. 27 first flight date, which is one month ahead of the original Mar. 15 target established two years ago.

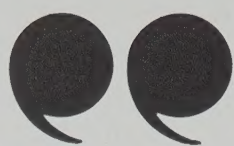


*Not just one, but two new DC-9's were rolled out for impressive ceremonies.*

*One of the distinctive features of the DC-9 is the tail section illustrated.*







**Here's  
what  
airline  
presidents  
say...**



The DC-9 was shown to be ideally suited for the jet market routes of Hawaiian Airlines. Capable of operating from existing runways while carrying a profitable payload, the aircraft can fly several route segments without refueling with a resultant time saving in ground handling costs alone. In addition, the totally new aircraft will have an immediate stimulation to total inter-island passenger traffic.

JOHN H. MAGOON, JR.  
*President*



Our initial order for fifteen of the DC-9's with an option for fifteen more will number Delta's hundredth Douglas-built airliner. Our experience evidences the quality and dependability of Douglas-built aircraft over a period of twenty-five years. We are confident the DC-9 will be worthy of the Delta colors and will represent another milestone in the distinguished line of Douglas aircraft which have contributed so much to air transportation all over the world.

C. E. WOOLMAN  
*President and General Manager*



Bonanza's route system is characterized by longer-than-average local service stage lengths, airports at high elevations, mountainous and desert terrain, hot and cold climatic conditions, and turbulent air at low altitude. The nonstop operating authority of Bonanza is applicable to markets ranging in distance from 235 miles to 601 miles. Its system is comprised of both competitive and non-competitive routes. Its markets lie in an area of the U.S. that leads the nation in virtually every index of growth and progress. Many of these rapidly expanding travel markets on its system require dif-



fering but comparable treatment as to quality and quantity of air service.

Such a diversity of demands upon an airline fleet would seem to indicate a need for several types of aircraft. However, the flexibility and adaptability of the DC-9 fan/jet are such that the plane can serve as a multiple purpose aircraft for an operation of this nature, meeting a remarkable variety of requisite standards.

EDMUND CONVERSE  
*President and Chairman of the Board*



Air Canada chose the Douglas DC-9 twin-jet, following the most exhaustive equipment analysis ever undertaken by the airline, on the basis of the DC-9's ability to be economically integrated into Air Canada's route structure and its projected fleet makeup at the time of delivery and on into the future.

From forecasts prepared of future passenger traffic over the Canadian carrier's particular routes, the aircraft combines the lowest operating costs for the airline with the most desirable flight frequencies for the passenger.

G. R. MC GREGOR  
*President*



To sum up the results of all these investigations ten DC-9's were finally ordered for the following main reasons:

General cost effectiveness in connection with Swissair's long-term evaluation of revenue potential

Reliability and maintainability characteristics combined with long life expectancy

Technical growth possibilities of the airframe supported by an engine well proven at the time of delivery (June 1966) and also capable of further development

Field performance

Integration with the DC-8 fleet

Cargo carrying capacity

Cabin width and window arrangement

Operational autonomy and flexibility on the ground due to auxiliary power unit and ventral stair specified by Swissair

WALTER BERCHTOLD  
*President*



The DC-9 will have a low plane-mile cost. This factor is important on many competitively served medium and short haul routes which have relatively low traffic density. On such routes, the lower seat-mile cost of a larger jet could not be translated into satisfactory operating profits because of the lower attainable load factor. The DC-9 will afford the best opportunity for fully competitive service and profitable operation.

CHARLES C. TILLINGHAST, JR.  
*President*



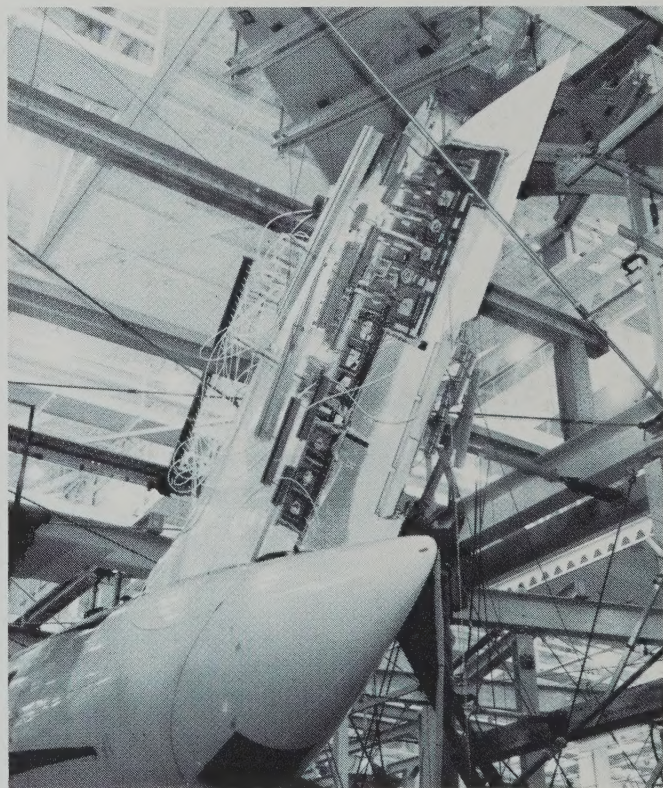
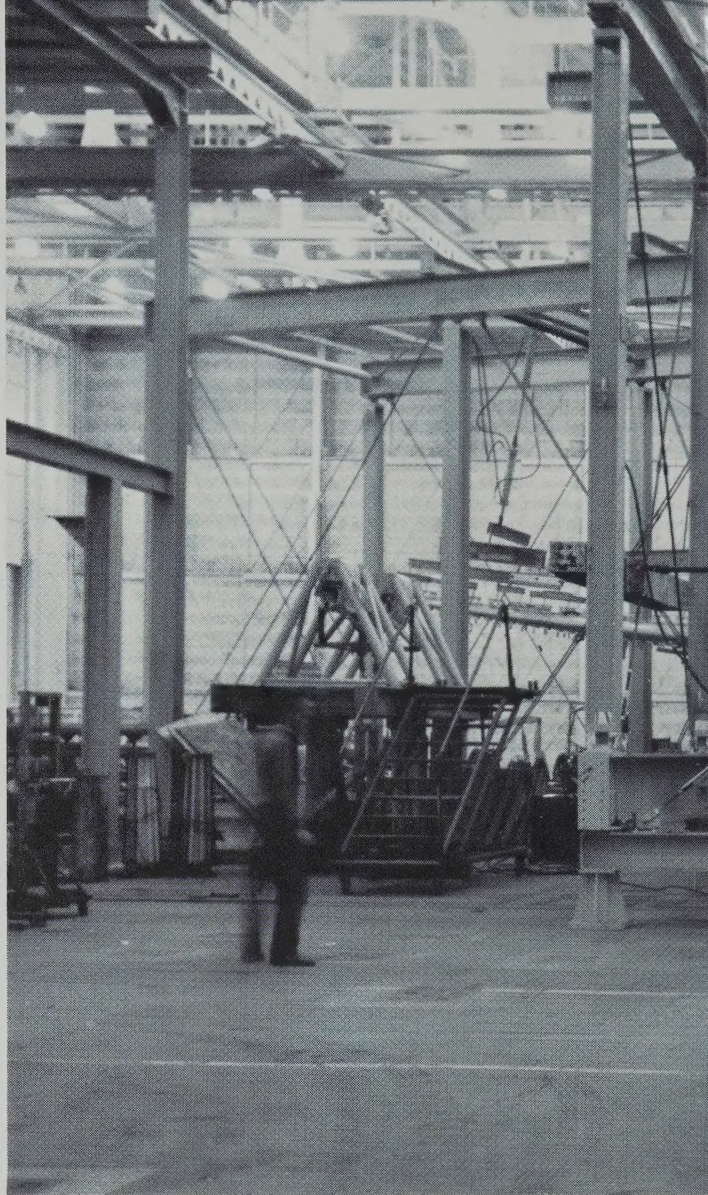


# Structural proof tests

Over thirty structural proof tests have been conducted upon the fixed and movable components of DC-9 Ship No. 2. For the wing, the tests performed covered the most critical conditions experienced during both flight and landing and the resulting wing deflections. While subjected to the flight loads, all movable control surfaces (spoilers, flaps and ailerons) were successfully demonstrated to meet their operational requirements.

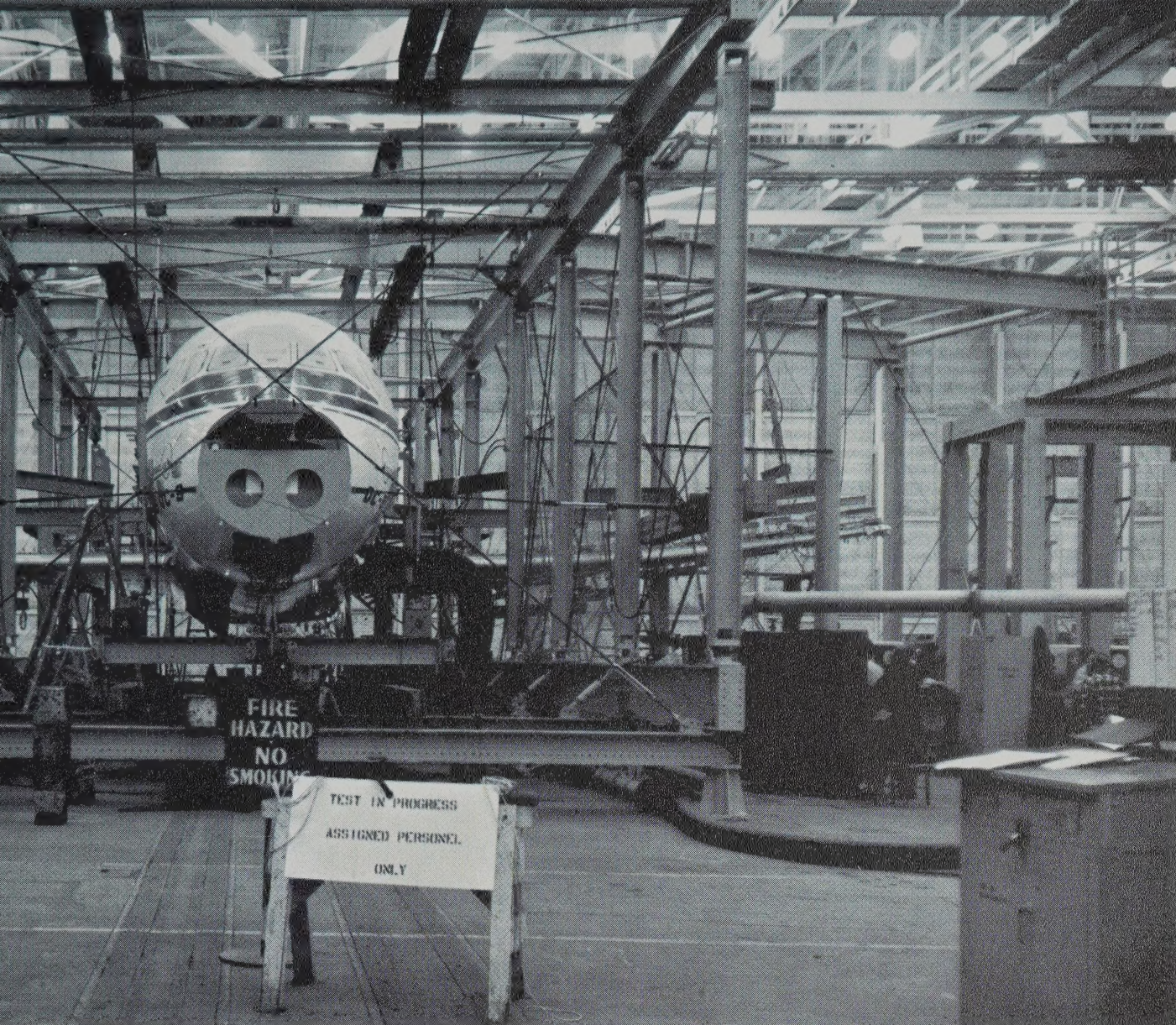
Critical fuselage design conditions required tests for flight-induced vertical, side, and roll bending, with and without design cabin pressure, as well as two ground turning configurations. The empennage horizontal and vertical surfaces and the tail stub were checked out for five critical design conditions. All movable tail components were rotated successfully at various load increments in movability demonstrations.

That the DC-9 is worthy of being the newest addition to the traditionally fine family of DC transports was dramatically demonstrated by the manner in which Ship No. 2 withstood proof testing. The unusually good agreement between design analysis and test results forecasts a life of profitable service for the new entry into the short-to-medium haul field.

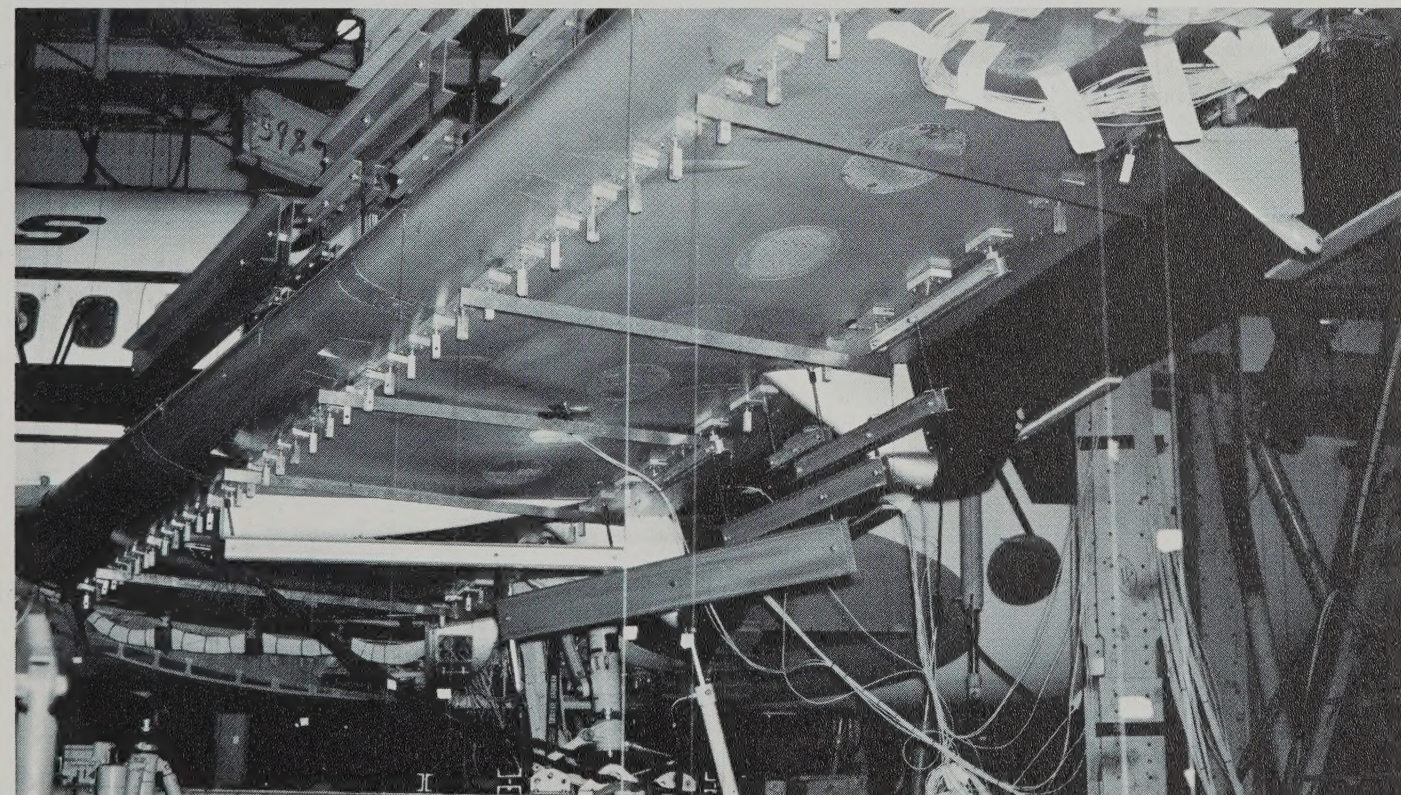


*Displayed here is the empennage proof test setup. Featured are unsymmetrical horizontal tail load, vertical stabilizer load, rudder tab load, and rudder high-torque load. At 80% limit load, both rudder and rudder tab were moved by their respective control systems.*





*This head-on view shows the deflection of the wing under 100% limit design load.*



*Shown here is the left-hand wing in a view looking inboard. Features include Douglas-developed load fittings attached to the wing through production attach holes. Following completion of proof testing and removal of fittings, attachments will be completed per production specifications.*



# DC-9 FIRST FLIGHT



***A new Crown Prince joins the Douglas Royal Family of Jetliners***

The DC-9 team has accomplished a phenomenal feat. The maiden flight came off without a hitch on February 25th—a full month earlier than scheduled. Flight time was extended to 2 hours and 15 minutes in duration and the DC-9 No. 1 landed smoothly at Edwards Air Force Base for further testing.

Test Program officials report (as of March 16th) that in 36.5 flight hours no problem areas have been encountered. The Douglas determination is to secure an FAA Certification on or before the promised date of January 1966.

On the first flight, the new aircraft took off with a gross weight of 77,000 pounds. Takeoff roll with a 3-4 kt. tailwind was about 3200 ft. Maximum indicated air speed (IAS) was 250 kt. at 20,000 ft. Landing gear was recycled several times during the flight. Low-speed handling characteristics were reported excellent with roll response very good.

During the second flight, gross takeoff weight was about 80,000 pounds. The autopilot, *which also had been used on the first flight*, was employed to shoot a fully coupled automatic approach at Edwards AFB at the end of the flight.

Third flight—maximum speed 275 kt.

IAS at 25,000 ft.—was reached as handling characteristics were explored further. Engines were air-started successfully at 15,000 ft.

Crew members on the first flight were George Jansen, chief engineering test pilot, Paul Patten, (see page 14), test pilot, and Duncan Walker, flight test engineer. John C. Londelius, director of flight development for the Aircraft Group, said he knew of no other instance in which an automatic approach had been attempted so early in a test of a new airplane. "It proves our handling characteristics are being achieved, since the autopilot settings had been made for those calculations."

While testing is being continued, it is significant to note that during the first 14 days of operations, the DC-9 No. 1 logged 13 flights for a total air time of 24 hours and 5 minutes. On some days, two flights of more than two hours duration each were made. The aircraft (as of March 18) also has achieved a top altitude of 31,000 ft., maximum speed of 325 knots, and a Mach number of .75. Photo and tape-recorded data have indicated *extremely satisfactory* results which duplicate the predictions from previous wind tunnel tests. ■ ■









*CHECKING OUT for her maiden flight, DC-9 No. 1 proudly displays the distinctive tail which will soon become a familiar sight throughout the world.*



*SHE'S OFF! Starting to taxi for take-off, the new jet is being piloted by George Jansen with Paul Patten as co-pilot, and Duncan Walker as flight test engineer.*



*THESE STEWARDESSES were not included on the first flight, of course, but they represented seven air line buyers of the DC-9 at time roll out ceremonies were held.*



## **Design, coordination, advanced planning, and dedicated effort built the most-needed jet**

by JOSEPH S. DUNNING  
DC-9 Program Effectiveness Administrator



On January 12, 1965, the "Roll Out" ceremonies for the first DC-9 were held. In contrast to customary roll out ceremonies wherein only one aircraft is presented, No. 1 DC-9 was immediately followed by airplane No. 2. This juxtaposition was symbolic of the tempo of the DC-9 Program.

While the admiring throng was inspecting the "first born" one month ahead of schedule, the assembly of airplane No. 3 was almost 50% complete, No. 4 over one-third complete, No. 5 was 25%, No. 6 15%, and assembly had started on No. 7. Within the fabrication shops, detail parts were in various stages of completion for an additional 28 aircraft.

Original plans laid down over two years ago scheduled the first airplane to fly in March of 1965, to be followed by the first flight of No. 2 two months later. The first five airplanes would have been airborne by the first of August. Number 1 aircraft actually flew one month early and current schedules, with three aircraft being completed in a single month, call for the first five airplanes all to be flying before the end of June 1965.

It is worthy of note that while four of the first aircraft are flight test units, never has a commercial aircraft been so complete at this stage. Instead of the usual bare minimum structural shell, these DC-9 test aircraft are complete to the last detail of interior systems, trim and paneling. Only those things have been omitted which would otherwise interfere with the installation of test equipment. By the time these four airplanes, augmented by airplane No. 7, complete their eleven-month flight test program leading to certification by the Federal Aviation Agency, thirteen more DC-9's will have flown and will be ready for entry into airline service in the United States, Canada, and Europe.

By the end of the same year, 1966, a total of 105 aircraft will proudly display

*DC-9 No. 4 in assembly line prior to wing joining.*





the colors of 14 different airlines as they fly people in and out of cities and towns which, in many cases, had not enjoyed jet service. At the same time in California, in 36 other states, and in Toronto, Canada 65,000 people will be busy building materials and components to keep production rolling.

Current plans for a three-a-week DC-9's by the spring of 1967 will mean an average of approximately 200,000 airframe and systems components being assembled into a complete aircraft every two working days.

As of this writing (mid-March '65), Airplane No. 1 has already accumulated over 36 hours of flight test with an average of 1¾ hours per flight. Airplane No. 2, after having been subjected to an intensive two-month structural proof test program, is in final installations, scheduled to be completed April 15, 1965.

Number 3 is nearing completion in the final line.

Airplane No. 4 is in wing-to-fuselage joining. The assembly of No. 5 is over 50% complete.

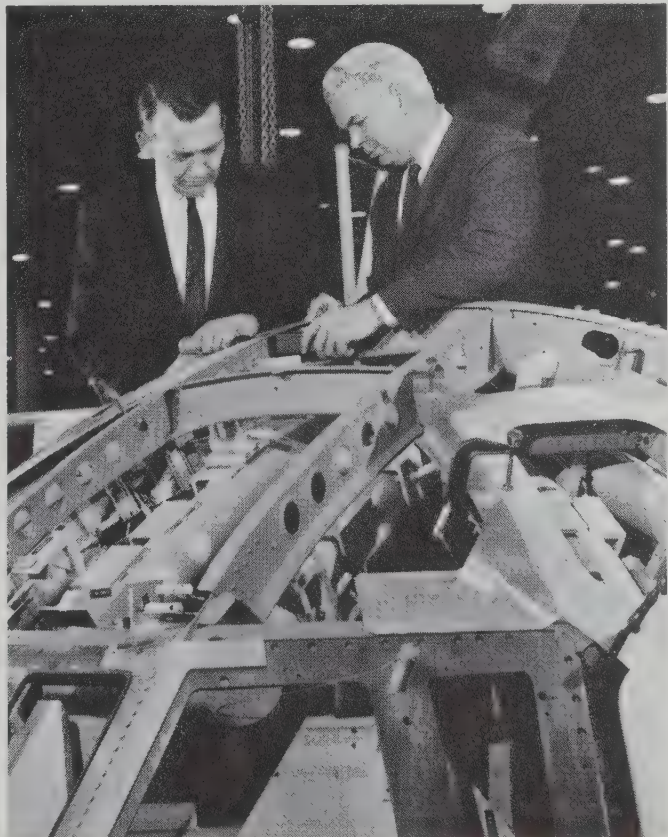
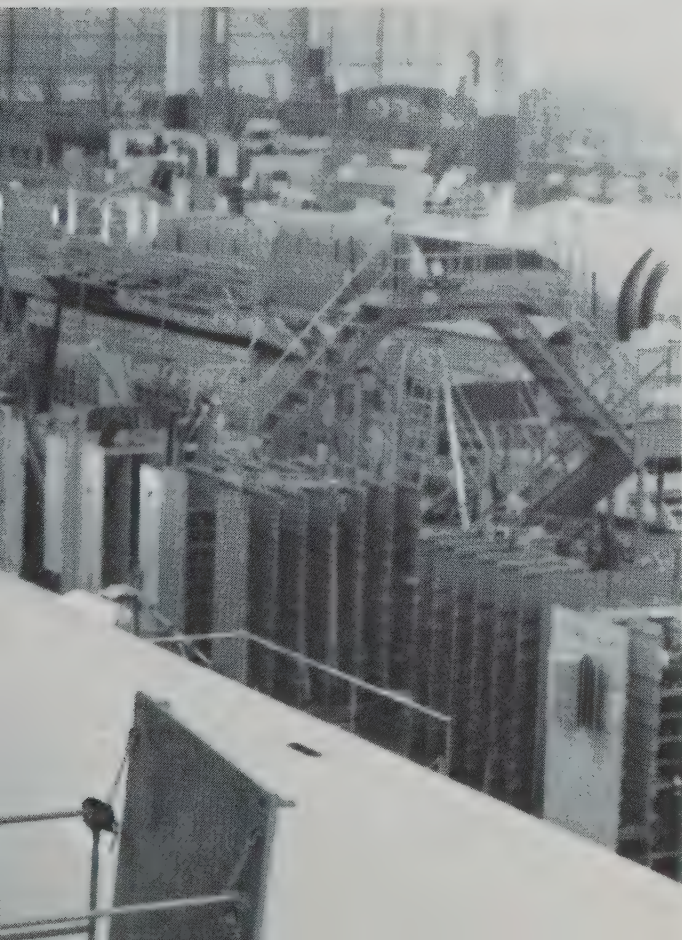
*On March 6, 1964, Mr. Donald W. Douglas, Jr., President, and Mr. Jackson R. McGowan, then Vice President, Aircraft Division, were photographed driv-*

*ing a golden rivet signifying the start of assembly of the first DC-9. Exactly one year later, assembly on the tenth DC-9 had started. All major subcontractors are in step with the accelerated pace. At De-Havilland work has started on the assembly of wing No. 17.*

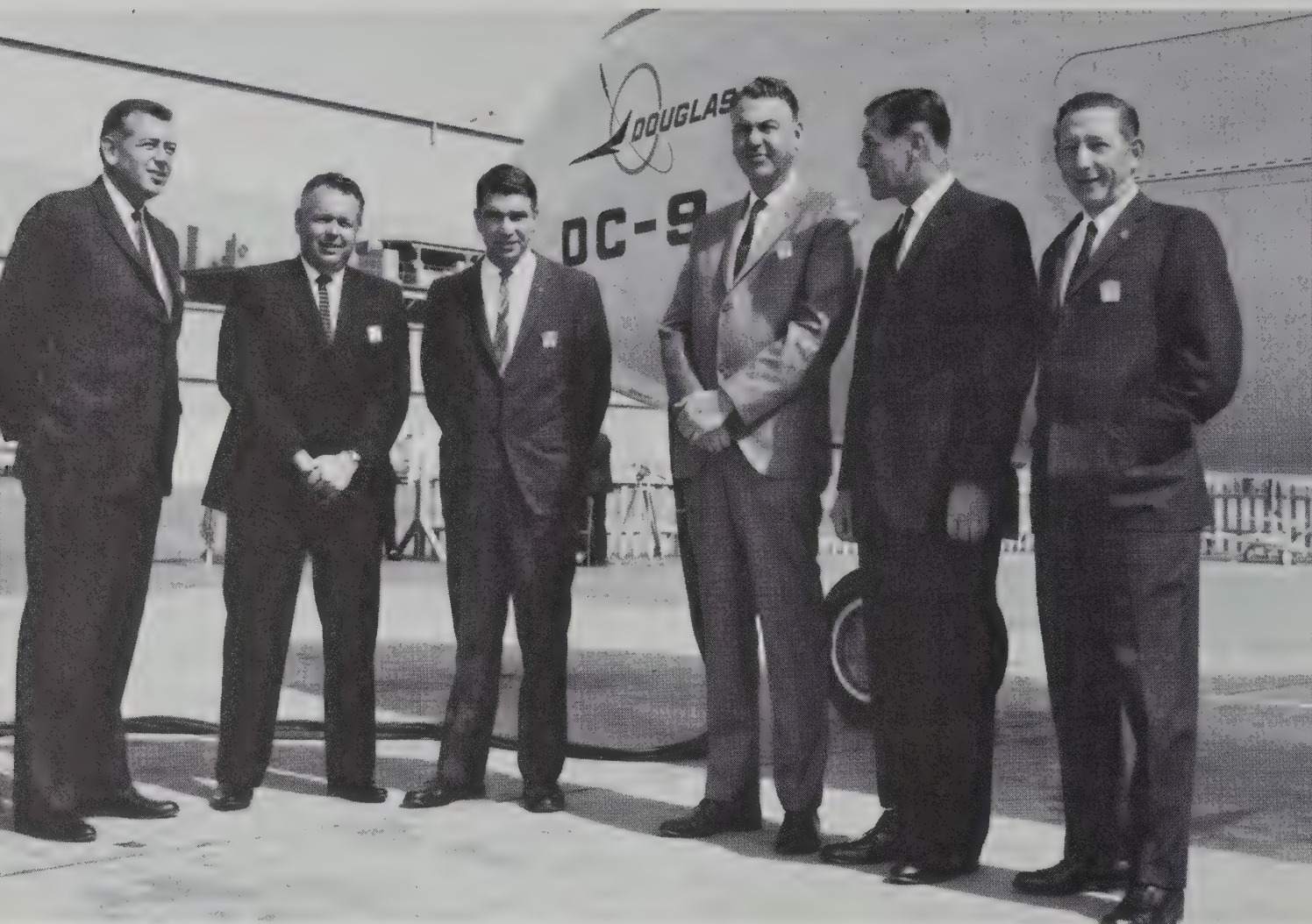
Already 465 airline personnel have been processed through Douglas-conducted training courses. The voluminous Illustrated Parts Catalogue has not only been issued to all customers, but several updating reissues have been supplied. The Flight Crew Operating and the Maintenance Manuals are in use right now during the flight test program. Complete current manuals, customized to each airline's needs, will be available upon certification of the airplane. Advance copies for purposes of airline planning and training will be available well before then.

To date, every major milestone in the DC-9 Program has been on, or ahead of, schedule. ■ ■

*Donald W. Douglas, Jr. and Jackson R. McGowan drive golden spikes at start of assembly of No. 1, March 6, 1964.*







*Just prior to first flight, these men gathered in front of DC-9 No. 1. Reading from left to right, they are: G. R. Jansen, Chief Engineering Test Pilot; P. H. Patten, Manager, Flight Operations and Training; J. C. Brizendine, Deputy General Manager for the DC-9; J. C. Londelius, Director of Flight Development; A. G. Heimerdinger, Chief Pilot; C. S. Glasgow, Chief Engineer. At the controls when the jetliner eased off the runway were George Jansen, chief pilot . . . Paul Patten, co-pilot . . . Duncan Walker, flight test engineer.*

## DC-9 Orders as of Press Time

	Ordered	Lease	Options	Grand Total
Delta	15			
Bonanza Air Lines	3			
Air Canada	8			
Swissair	12			
Trans World Airlines	20			
Hawaiian Airlines	2			
KLM	6			
Ozark	3			
Eastern Air Lines	24	15		
West Coast	3			
Saudi Arabian	3			
Continental	12			
Ansett-A.N.A.	2			
Iberia	3			
<b>Totals</b>	<b>116</b>	<b>15</b>	<b>106</b>	<b>237</b>



# DC-9

## *sales report*

*More detail on these  
important airlines will follow  
in the next  
DC-9 Progress Report*



*Continental orders 12 DC-9s*

*Ansett-A.N.A. orders 2 DC-9s*







*Iberia orders 3 DC-9s*

*West Coast orders 3 DC-9s*







*KLM orders 6 DC-9s*

*Saudi Arabian orders 3 DC-9s*







*Ozark Air Lines selects the DC-9*

## OZARK AIR LINES NEWS BUREAU

Ozark Air Lines has ordered three Douglas DC-9 jet transports for operation on its prime routes according to an announcement made today by Thomas L. Grace, President. Pending final approval of the Civil Aeronautics Board and technical arrangements now in progress, delivery will be made in Spring of 1966. Cost of the airplanes and spare parts is approximately 11 million dollars.

Powered by two Pratt and Whitney fan-jet engines – the newest of the Douglas jet-liners will cruise at a speed of 575 miles per hour. Arrangements of its spacious cabin can be quickly adjusted to an Ozark configuration accommodating 80 passengers.

Mr. Grace also stated that "the DC-9 which has the same speed and cabin comfort as the four engine DC-8 type jet-liner is certain to attract more passengers than the jet-prop planes presently used on Ozark's intermediate range routes. It will also provide Ozark's passengers with the finest service now available." Information on the cities to be served initially, and the schedules will be available at a later date. The planes will be utilized on those routes offering the greatest economic potential.

Ozark's order of the three airplanes increases the Douglas Aircraft Company's total orders for the DC-9 to 61.

The first of the new jet liners was rolled out at the company's Long Beach facility on January 12 and will have its first scheduled flight in March.





## **EASTERN AIR LINES, INC.**

The following announcement was made today  
by Mr. F. D. Hall, President of Eastern Air Lines

Eastern Air Lines has placed an order with the Douglas Aircraft Company, Inc., for a fleet of 24 of an advanced model of the short-to-medium range twin-jet Douglas DC-9, the newest in the family of jet airliners.

The twenty-four airplanes represent an investment of approximately \$84 million and will enable Eastern to provide the advantages of high-speed jet service to many additional communities which cannot be effectively served by the longer range three and four engine jets in today's operations.

In order to make these improved services available to the public at the earliest possible date, an interim lease arrangement has been entered into with the manufacturer whereby 15 of the standard DC-9 aircraft will be delivered to Eastern on a schedule beginning in March 1966 and ending in September 1966.

Deliveries of Eastern's more advanced and slightly larger DC-9's will begin in the latter part of the year, with expected certification in November 1966. Deliveries of the advanced Eastern version will continue until a fleet of 26 DC-9's, including both the standard and advanced models are on hand early in 1967. Thereafter, they will be exchanged for the leased aircraft on a schedule designed to place all twenty-four of the Eastern models in service by the end of 1967.

Eastern's advanced type DC-9's will be distinguished from the earlier units in that they will be better adapted to Eastern's route structure, with greater wing area and special high-lift devices to provide improved take-off and landing capabilities for small fields and short ranges. Overall dimensions of the advanced type will also be slightly larger.

With significant financial participation by the manufacturer and internally generated funds developed if the present strength in the national economy and airline traffic continue, it is expected that the program can be consummated without external financing.

The Douglas DC-9 is a twin fan jet aircraft, with T-tail and rear-mounted engines. It will be powered by two Pratt & Whitney by-pass fan-jet engines, similar to those now used in Eastern's three-engine Boeing 727 "Whisperjets." It will have a capacity for 80 passengers and will be capable of unrestricted operation out of most airports in the Eastern system and on inter-city ranges of 100 to 800 miles. Its normal cruising speed is 560 m.p.h.

The basic dimensions are 104 feet 4 inches in overall length, wing span of 87 feet 4 inches, and maximum height above the ground of 27 feet 6 inches. Equipped with integral forward passenger stairways, Eastern's DC-9's will have galleys for dining service aloft, and will also carry integral auxiliary power generating units to make them independent of ground equipment at smaller airports.





*Eastern Airlines tops DC-9 orders to date. See story on Page 19.*

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